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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/765,300	01/27/2004	Stephen N. Hammond	6001.1001	9294

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KRIEG DEVAULT LLP
ONE INDIANA SQUARE
SUITE 2800
INDIANAPOLIS, IN 46204-2079

EXAMINER

ALEXANDER, MICHAEL P

ART UNIT PAPER NUMBER

1742

DATE MAILED: 07/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/765,300	Applicant(s) HAMMOND ET AL.	
	Examiner Michael P. Alexander	Art Unit 1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 May 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 5-15, 17-27 and 30-52 is/are pending in the application.
- 4a) Of the above claim(s) 39-51 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 15, 17-27 and 30-38 is/are allowed.
- 6) ☒ Claim(s) 1-3, 5, 8-11 and 52 is/are rejected.
- 7) ☒ Claim(s) 6-7 and 12-14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim(s) 1-3, 5-15, 17-27, 30-52 is/are pending.

Election/Restrictions

Applicant's election of Group I in the reply filed on 8 May 2006 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claims 39-51 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 8 May 2006.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-3, 5, 8-11 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over any one of Somers (US 2006/0090817) in view of Christmas (US 6,218,642) and the ASM Handbook, volume 4. Note that page citations will refer to provisional application 60/401,215 (enclosed).

Regarding claim 1, Somers teaches (page 2 line 23 – page 3 line 20) a method of increasing the hardness of a steel object, comprising: applying a nickel plating to at least a portion of a surface of the steel object; subjecting the steel object to carburizing to allow carbon atoms to diffuse through the nickel plating and form a case portion; and removing the nickel plating from the steel object. Somers does not specify heat treating the steel object after said removing and do not specify that the case portion would have a hardness of at least Rc 50.

With respect to the step of heat-treating the steel object after said removing in claim 1, Christmas teaches (col. 1 lines 48-65) grinding after carburizing in order to obtain the desired hardness depth. It would have been obvious to one of ordinary skill in the art to modify the method of Somers by grinding after carburizing in order to obtain the desired hardness depth as taught by Christmas. Furthermore, the ASM Handbook, volume 4, teaches (page 33) stress-relief heat treatment in order to relief residual stresses cause by grinding. It would have been obvious to one of ordinary skill in the art to modify the method of Somers in view of Christmas by applying a stress-relief heat treatment after grinding in order to relief the residual stresses caused by grinding. The Examiner notes that the stress relief heat treatment would necessarily take place after

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the removing the nickel plating because the stress relief heat treatment would occur after the carburizing and grinding.

With respect to the limitation that the case portion would have a hardness of at least Rc 50 in claim 1, the ASM Handbook, volume 4, teaches (pages 260-261) that case hardness of carburized steels is primarily a function of carbon content. Since case hardness is a result effective variable as taught by the ASM Handbook, volume 4, it would have been obvious to one of ordinary skill in the art to modify the method of Somers by controlling the carbon content of the case portion and obtain the desired case hardness as a routine optimization as taught by the ASM Handbook, volume 4. See MPEP 2144.05 II.

Regarding claim 2, Somers do not specify the case depth. However, the ASM Handbook teaches (page 261) that case depth is a function of carburizing time and the carbon potential at the surface. Since case depth is a result effective variable as taught by the ASM Handbook, it would have been obvious to one of ordinary skill in the art to modify the methods of Somers by selecting the desired case depth by adjusting the carburizing time and carbon potential at the surface as a routine optimization as taught by the ASM Handbook. See MPEP 2144.05 II.

Regarding claim 3, Somers teaches (page 4 line 1-3) applying the nickel by electroless processes.

Regarding claim 5, Somers do not specify removing the nickel-plating after annealing and before further heat-treating acts. However, it is well known in the art to conduct machining after annealing and before further heat-treating acts as evidenced by

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the ASM Handbook (Vol. 4) (see page 714) because the annealed condition allows the steel to be easily machined. It would have been obvious to one of ordinary skill in the art to modify the method of Somers by removing the nickel-plating after annealing and before further heat-treating acts because the annealed condition allows the steel to be easily machined as taught by the ASM Handbook (vol. 4).

Regarding claim 8, Somers teaches (page 1 lines 1-2) that the object would be stainless steel.

Regarding claim 9, Somers does not specify that the carburizing would be vacuum carburizing. However, the ASM Handbook (Vol. 4) teaches (col. 2 page 262) carburizing in a vacuum atmosphere in order to reduce the time required to achieve the case depth desired. It would have been obvious to one of ordinary skill in the art to modify the method Somers by carburizing in a vacuum atmosphere in order to reduce the time required to achieve the case depth desired as taught by the ASM Handbook (Vol. 4).

Still regarding claim 10, Somers does not specify the steps of evacuating the carburizing atmosphere to a sub-atmospheric pressure, heating the steel object to the carburizing temperature, admitting carburizing gas into the carburizing atmosphere and drawing a further vacuum that begins with the admitting of carburizing gas into the carburizing atmosphere. However, the ASM Handbook Vol. 4) teaches (pages 348-349 and Fig. 1) a method of carburizing in a vacuum atmosphere including evacuating the carburizing atmosphere to a sub-atmospheric pressure, heating the steel object to the carburizing temperature, admitting carburizing atmosphere and drawing a further

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vacuum that begins with the admitting of carburizing gas into the carburizing atmosphere. The ASM Handbook (Vol. 4) further teaches that vacuum carburizing offers excellent uniformity and repeatability. It would have been obvious to one of ordinary skill in the art to modify the method of Somers by evacuating the carburizing atmosphere to a sub-atmospheric pressure, heating the steel object to the carburizing temperature, admitting carburizing atmosphere and drawing a further vacuum that begins with the admitting of carburizing gas into the carburizing atmosphere in order to have excellent uniformity and repeatability as taught by the ASM Handbook (Vol. 4).

Regarding claim 11, Somers do not specify masking a portion of the steel object prior to said applying to prevent nickel plating on the portion of the steel object. However, the ASM Handbook (Vol. 4) teaches (page 321) using a lacquer to coat surfaces that are not to be plated prior to carburizing. It would have been obvious to modify the method of Somers by using a lacquer to coat surfaces that are not to be plated prior to carburizing in order to prevent carburization to those surfaces as taught by the ASM Handbook, volume 4.

Regarding claim 52, Somers teaches (page 3 lines 18-20) removing the nickel layer from the article. Somers does not limit the teaching to removal of only a portion of the nickel layer, therefore the teachings of Somers would include removing the entire nickel layer.

Response to Arguments

Applicant's arguments with respect to claims 1-3, 5-15, 17-27, 30-52 have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

Claims 15, 17-27, 30-35 and 36-38 are allowed.

Claims 6-7 and 12-14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claims 6-7 and 12-14, the prior art does not teach applying the nickel plating to thicknesses greater than about 0.0005 inches in combination with the claimed invention. Instead the closest prior art, Somers, teaches applying the nickel plating to hundreds of nanometers at most.

Regarding claims 15, 17-27, 30-34 and 36-38, the prior art does not teach hardening the object after removing the nickel plating in combination with the claimed invention.

Regarding claim 35, reasons for allowance were stated in the Office Action of 31 October 2005.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael P. Alexander whose telephone number is 571-272-8558. The examiner can normally be reached on M-F 10:00 - 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

ROY KING 
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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